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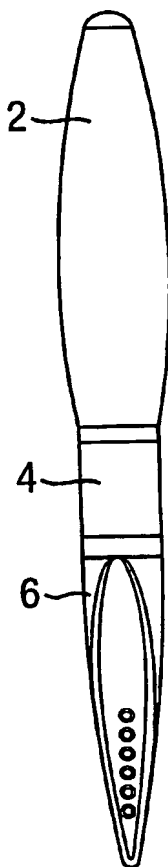
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(54) Title: **DISPOSABLE PRODUCT DISPENSER**



(57) Abstract: A disposable product dispenser for dispensing product (60) into a liquid prior to consumption by a user comprises a quantity of product (60) sufficient for a drink or dose, and a holder (1) for the product. The holder (51) is arranged to permit a user to release the product in a controlled manner and to mix the product with a liquid. The dispenser may be for dispensing a liquid or solid and has particular application in the beverage industry permitting customers to mix their own drinks.

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## DISPOSABLE PRODUCT DISPENSER

The present invention relates to a product dispenser for dispensing a stored product into a volume of liquid. The product may be either a liquid or a soluble solid and is particularly, but not exclusively, applicable to the drinks and pharmaceutical industries.

In the beverage field, concentrates are often added to base liquids to change their flavour, aroma and/or colour. Typically, different syrups are selectively added to carbonated water to provide a selection of different soft drinks such as cola, lemonade, orangeade, etc.

In bars mixers are added to various drinks to provide cocktails. In both cases, large volumes of the concentrate or spirits have to be stored and both accurate measuring and mixing has to be thoroughly effected before serving to the customer. This denies the customer the opportunity of mixing the drink to his preferred taste.

It is an object to the invention to provide an improved dispenser which allows the customer, rather than the server, to dispense and mix his own beverages.

A further object of the invention is to provide a dispenser which permits a patient to conveniently mix appropriate pharmaceuticals with a liquid.

According to the present invention there is provided a disposable product dispenser for dispensing product into a liquid prior to consumption, the dispenser comprising a quantity of product sufficient for a drink or dose and a holder for the product, wherein the holder is arranged to permit a user to release the product in a controlled manner and to mix the product with the liquid.

The present invention provides a dispenser which can be purchased by a customer in a bar which enables the customer to mix a beverage, for example a soft water based drink, an

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alcoholic drink or coffee to his desired taste. The customer may simply purchase the dispenser containing a sealed and measured quantity of product and dispense this into a volume liquid, for example carbonated water or hot water, which may be freely available at a collection point.

5

Employing the present invention, the time consuming mixing of the drink is transferred from the vendor to the purchaser, providing a significant advantage to the vendor. Meanwhile, the purchaser can expect to receive product supplied, pre-packed in the dispenser, of the desired quality and quantity and maintained in a sterile environment prior to opening by the customer.

10

An additional benefit of the dispenser in accordance with the invention is that it may be arranged to provide the customer with a significant "play factor" when dispensing the product, depending on the nature of the product and the environment in which it is to be sold. For example the product, if a liquid, may be oil based and if dispensed into water can be arranged to provide interesting suspensions prior to complete mixing. The novelty factor which can be provided by a dispenser in accordance with the present invention can be of significant marketing importance, particularly in a bar or coffee house environment.

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Another major advantage of a dispenser in accordance with the present invention is that it can be used to permit automated dispensing of a product.

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A dispenser in accordance with the present invention may be used not only for the dispensing of beverages, but may also be used to supply pharmaceutical preparations to a patient and has application to the provision of any substance that requires mixing with a bulk volume of liquid, particularly if that liquid is for consumption by a human and it is important to know that the product has been maintained in a sterile environment.

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The dispenser may advantageously be in the form of a spoon with a cage mounted on the handle of the spoon towards the bowl of the spoon. A product in the cage, for

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example coffee, can then released by a user into a cup of hot water.

A dispenser in accordance with the invention may comprise a mixing section having an inlet and an outlet, means defining a first path, extending helically in one sense about an axis, means defining a second path extending helically in the opposite sense about said axis, both said paths being positioned to receive substantially equal amounts of fluid from said inlet and to discharge the fluids flowing there along to a common location adjacent said outlet, whereby to effect turbulent mixing.

Disposable product dispenser embodying the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which like numerals are used to indicate like parts and in which:

Figure 1 is a front elevation of the system;

Figure 2 is a side elevation of the system of Figure 1;

Figure 3 is a plan view of the system of Figure 1;

Figures 4, 5 and 6 are, respectively, a front elevation, a side elevation and a plan view of the mixing component of the system of Figure 1;

Figure 7 is a section taken along the line 7-7 of Figures 4 and 6;

Figure 8 and 9 are, respectively, a front and a side elevation of the dispensing component of the system of Figure 1;

Figure 10 is an under plan view of the dispensing component of Figures 8 and 9;

Figures 11, 12 and 13 are, respectively, a front elevation, a side elevation and a plan view of the storage component of the system of Figure 1;

Figure 14 is a section taken along lines 14-14 of Figure 13;

Figure 15 illustrates a dispenser in accordance with the present invention for mixing liquid product into a drink;

Figure 16 illustrates how a plurality of dispensers of Figure 15 may be packaged;

Figures 17 to 18 disclose an embodiment similar to that illustrated in Figures 1 and 2 where a product for mixing is additionally contained within the mixing section;

Figures 19 to 21 illustrate various embodiments of the present invention when

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applied to a straw;

Figures 22 to 23 illustrate the present invention applied to a mixing stick; and

Figures 24 to 38 illustrate various embodiments of a dispenser in accordance with the present invention, applied to a spoon.

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As shown in Figures 1 to 3, a first embodiment of the invention consists of three components, a storage component 2 for a product, a mixing component 4 and a dispensing component 6.

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The mixing component, which can be more clearly seen in Figures 4 to 7, comprises a hollow cylindrical body 8 of predetermined internal and external diameter. The body has an upper rim or collar portion 10 of reduced internal diameter sized to accommodate the lower end portion of the storage component, and has a lower rim or collar portion 12 of reduced external diameter to matingly engage an opening in the upper end of the dispensing component 6.

15

The body 8 has a central axially extending rod 14 with a pointed upper end 14A which extends into the region of the upper rim portion 10. The rod 14 is supported within the body 8 by a pair of arcuate flanges 16 and 18 which extend between the inner wall of the body 8 and the rod 14. Each flange subtends at an angle of 180° about the axis of the rod 14 and spirals downwardly in opposite senses about the axis of the rod 14.

20

Thus, the upper radially extending end of each flange 16 and 18 starts from a common line extending diametrically across the cylindrical body at junction with the lower end of the upper rim portion and the lower radially extending end of each flange terminates in a common line extending diametrically across the cylindrical body at the junction with the upper end of the lower rim portion. Thus, the axial length of each flange equals the distance between the upper and lower rim portions. In operation, when a liquid is discharged into the upper rim portion 10, half the liquid will be swirled about the rod 14 in a clockwise sense by one of the flanges and the other half of the liquid will be swirled

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- 5 -

around the rod 14 in an anticlockwise sense. The resulting two streams of liquid leaving the flanges will meet swirling around in opposite senses to ensure a high degree of turbulence in the resulting flow.

5           The free lateral faces of the two flanges at their lower ends lie in a common vertical plane to ensure that the liquid flowing down each flange breaks away from the surface of the flange as it is discharged therefrom.

10           The angular downward slope of each flange preferably lies in the range of from 40° to 60° but more advantageously lies in the range of from 45° to 55°.

15           The dispensing component which is more clearly shown in Figures 8 to 10 consists of an upper cylindrical support or collar 28 which has an internal diameter matching the external diameter of the lower rim portion 12 of the mixing component 4. Depending  
downwardly from the support 28 is an elongate hollow conical portion 29 decreasing in diameter with distance from the support 28. The conical portion is provided with two substantially flat faces 20 and 22 on diametrically opposite sides thereof.

20           Each flat face is provided with an axially extending row of six equally spaced openings 24 in the lower region thereof.

25           In operation, when the dispensing component is lowered into a body a liquid to a level in which all the openings 24 are submerged and a turbulent flow is introduced from the mixing component 4, the turbulent flow will emerge from all the openings 24 in a turbulent fashion to ensure a thorough mixing with the body liquid.

30           The storage component 2, as shown more clearly in Figures 11 to 14, has a lower collar 30 having an external diameter matching the internal diameter of the upper rim portion 10 which is arranged to receive the collar 30. Extending upwardly from the collar 30 is a generally elongate hollow bulbous portion 32 which is arranged to store the fluid

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which is to be discharged from the system.

The mouth of the collar 30 is bridged by a rupturable membrane (not shown) eg of plastics lined aluminium foil to seal the contents within the bulbous portion 32.

5

In operation, when the collar 30 is made to engage the upper rim portion 10 and urged downwardly, the pointed upper end 14A of the rod will pierce the membrane to release the contents into the mixing component 4 where turbulent mixing will occur. As the turbulent contents discharges from the mixing component 4, it enters the discharge  
10 component 6 to be released into a surrounding body of liquid through the openings 24.

The three components may be coupled together in a variety of ways, the couplings may be achieved by a force fit, adhesive or even a screw threaded connection.

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The fluid may flow through the system under gravitational force or the flow may be assisted by making the bulbous portion 32 of flaccid or resilient material so that pressure can be applied to it to force the fluid therefrom.

20

A variety of different sized or shaped storage components can be fitted to a standard sized mixing component. Equally, different sized dispensing portions or ones having different sized apertures, can be fitted to the mixing portion.

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While the three components can be provided as separate components for assembly at the point of sale, it is preferable to provide the system ready assembled with the particular size and shape combination dedicated to each different type of fluid to be dispensed.

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In this situation, the assembly of the storage component with the mixing component would need to be in a semi complete state in order to prevent the pointed end 14A of the rod prematurely piercing the membrane. Thus, for example, a tear off ring (not shown)



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may be provided around the collar 30 to prevent the collar 30 from fully engaging the upper rim portion and so holding the membrane spaced from the pointed end 14A.

By subsequently tearing off the ring, the two components 4 and 6 can then be fully  
5 pushed together to cause the pointed end 14A to pierce the membrane and release the fluid.

If the coupling between the collar 30 and the upper rim portion 10 is of the screw threaded type, the components may be initially only partially screw threaded together and locked or clamped in that state by an encircling band of plastics. Tearing off the band  
10 allows the two components to be fully screw threaded together to again release the fluid.

Other means of achieving the same end will be apparent. For example, the collar 12 may be closed by a valve which can be opened by the rod 14 or some other separate means. The valve may be magnetically operated by an external magnet.

15

Referring now to Figure 15, there is illustrated an alternative embodiment of the present invention, where the dispenser comprises a bulb 33 which forms a holder for a liquid product to be mixed into a drink. The bulb 33 is squeezable so that the product inside the bulb can be forced out through apertures 34 in the bulb. The apertures are  
20 configured such that when the bulb 33 is squeezed the liquid product exists the apertures 34 under pressure forming a jet of liquid, such that when the lower portion of the bulb 33 is immersed in a liquid, for example carbonated water, the contents of the bulb, which may be a flavouring, mix rapidly with the liquid already present.

25 Prior to use, the jets 34 are covered by a seal 35. This ensures that the product in the bulb 33 is of the quantity and quality expected and the seal may indicate the product type or flavour.

Referring to Figure 16, there is illustrated a plurality of bulbs 33 which are formed  
30 by a blown technique. The blown technique of manufacture not only produces bulbs 33 but

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also a retention portion 36 by which a plurality of bulb are joined to form a strip. Adjacent retention portions 36 are separated by pre-weakened lines 37 enabling the bulbs 36 to be separated. In turn each bulb 33 is joined to its retention portion 36 by further pre-weakened line 38, enabling the bulb 33 to be separated therefrom. The bulb 33, when separated from  
5 retention portion 36 has an aesthetically pleasing shape.

The dispenser of Figures 15 and 16 can be used to dispenser cocktails in a bar environment, but could equally be used for dispensing pharmaceuticals or other product it is desired to maintain in a sterile environment prior to mixing with a volume of liquid for  
10 internal consumption.

Referring now to Figures 17 and 18, there is illustrated a dispenser in accordance with the present invention, which is similar to that of Figures 1 to 14. In the embodiment shown in Figures 17 and 18, a mixing component 4 additionally comprises a product in  
15 solid form to be dispensed. The product to be dispensed may be a flavour for a drink, or a pharmaceutical. In a beverage application, the bulb and mixing section may be of some aesthetically pleasing design, as illustrated at 40 with, for example, an alcoholic beverage contained and sealed in bulb 2, with a colouring, flavouring or nucleating product, to cause  
20 fizz, contained in the mixing component 4. In this application, the quality and quantity of liquid in bulb 2 is known, being provided as a sealed item, and dispensing is controlled through the mixing component 4, the user controlling the volume of liquid in the bulb 2 dispensed. The dispenser also permits the individual to mix and match mixing components and bulbs to obtain a drink of a desired combination.

25 As indicated above the device may equally well be used for dispensing pharmaceuticals. In this case, as illustrated at 41, the bulb 2 and mixing component 6 may be of a simple functional design, bulb 2 possibly containing sterile water, to be mixed with a pharmaceutical, thereby providing safe sterile water of a known volume to be mixed with the appropriate dosage of drug, as desired.

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As illustrated at 42, the invention is equally applicable to chemicals and an appropriate liquid chemical could be contained in bulb 2 to be mixed in mixing component 4 with another chemical. The dispenser ensuring proper mixing of the chemicals prior to dispensing into a liquid.

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Regardless of the application, the dispensing component 6 may comprise fins 39 to assist in manual stirring of the final composition. In either embodiment, the bulbs 2 would normally be sealed to maintain the contents in a sterile environment, the seal being pierced by insertion of the bulb 2 into the mixing component.

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Referring now to Figure 19, there is illustrated a further embodiment of the present invention where the holder of the dispenser comprises a straw 40 having an upper section 41 and a lower section 42 joined by a casing 43 in which is stored a product to be dispensed which is in a solid form. As liquid is sucked through the straw 40, where it comes into contact with the product and dissolves the product. The product is designed to dissolve at an appropriate flow rate to add the desired taste to the liquid being drawn through the straw. The product may alter the texture of the liquid, by thickening it, introducing fizz or modify the taste of the product by introducing a flavour. Additionally, the product could be a menthol based product which provides a cooling effect in the mouth.

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A further straw type dispenser is illustrated in Figure 20 where a chamber 44 is located between the upper and lower sections of the straw. The chamber 44 is compressible and arranged to receive a capsule 45 which can be inserted through lower end of the straw. Once inserted, because of the shape of the capsule, it is difficult for the capsule to leave the chamber and therefore the capsule 45 is retained in the chamber. The capsule 45 contains a product to be released as the liquid is drawn through the straw and, immediately prior to use, the walls of the chamber 44 are compressed in order to rupture the capsule 45. The capsule 45 has a frangible section designed to rupture in a predetermined manner such that product is released from the capsule 45 at a predetermined rate, relative to the flow of liquid through the chamber 44.

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- 10 -

Referring now to the Figure 21 embodiment, this again illustrates a dispenser comprising a straw, but in this embodiment the straw 40 has a plurality of intermediate apertures 46. These are surrounded by a compressible reservoir 47 containing a liquid product. The apertures 46 are sealed prior to use by appropriate seals (not shown). The seals may be arranged to dissolve as liquid is drawn through the straw, for example starch based seals, or the seals may be designed to rupture when sufficient pressure is exerted on the walls of the flexible reservoir 47. As liquid is drawn through the straw 40, pressure is applied by the user to the reservoir 46 such that the product within the reservoir is mixed with the liquid being drawn through the straw at an appropriate rate to produce the desired taste.

In Figures 22 and 23, there is illustrated an embodiment of the present invention where product to be dispensed is in the form of a pellet 48 formed on the bottom of a mixing stick 49. The product, as shown in Figure 22, is retained in a sealed wrapper 50, the wrapper being removed, as shown in Figure 23, prior to use when the pellet is swirled around a drink until an appropriate quantity has dissolved.

Depending on the product to be dispensed, it may be advantageous to employ a dispenser in the form of a spoon. There are any number of possible configurations for such a spoon, but examples of particularly advantageous configurations are illustrated in Figures 24a to 38c.

Referring to Figure 24a, there is illustrated a nylon spoon 51 having a recess 52 therein, in which is moulded a predetermined quantity of product 53 which is in the form of a solid comprising flavouring contained within a solid starch. In use, a customer purchases the spoon 51, obtains a cup of hot water which he/she then stirs with the spoon 51 until the product 53 dissolves, leaving the spoon as shown in Figure 24b. An alternative embodiment is shown in Figures 25a and 25b where the spoon 51 comprises two portions, a handle portion 51a and a bowl portion 51b. Between the two portions is a spindle 54, on which the product in the form a short tube 55 is held in place, as shown in Figure

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25a, by the two sections 51a and 51b being snapped together. The spoon when purchased is contained in a sealed bag 56, as shown in Figure 25c.

Referring to Figure 26, an alternative embodiment, is illustrated which again, as shown in Figure 26a, is sold in a sealed bag 56. In this example, the spoon 51 comprises a cage 57 formed by the body of the spoon and nylon meshes 58 and 59. Mesh 58 is moulded integrally with the spoon while mesh 59 snaps into the spoon, as illustrated in Figure 26c, after the product 60 has been inserted. The product 60 may be coffee granules for example. As shown in Figures 27a and 27b, the mesh 58, and the corresponding mesh 59, can be sealed by a heat shrink seal 61 which is removed prior to use. When the seal is removed the spoon is immersed in hot water and stirred, causing the hot water to flow through the cage 57 dissolving the coffee or product contained therein.

Figures 28a, 28b, 29a and 29b show a further variation of the spoon 51, in which the product 60 is again retained in a cage 57 by meshes 58 and 59, but in this embodiment the cage has a hinged door 61.

Figures 30a and 30b show the cage 57 sealed by a heat shrink sleeve 62. Prior to use, a tear strip 63 is used to remove the heat shrink sleeve 62.

Referring to Figures 31a and 31b, there is illustrated a further alternative embodiment of spoon, where the bowl section 51b is removed from the handle section 51a to open a cage 57 formed integrally with the handle section 51a.

In a further alternative embodiment shown in Figures 32a and 32b, coffee or another product 60 is contained within a spoon 64. Spoon 64 comprising a plunger 65 for forcing the product 60 through a membrane 66, rupturing previously sealed compartment 67. The product 60 then enters the chamber 68 through which fluid may flow as indicated by arrows 69 in Figure 32b.

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A variation of the Figure 32a and 32b embodiment is illustrated in Figures 33a and 33b, where depressing a plunger 70 in spoon 71 conveys product 60 to a cage 72 where to be dissolved by water entering the cage 72, as shown in Figure 33b.

5 In the embodiments illustrated in Figures 34a and 34b, the spoon, indicated generally as 72, comprises a bowl portion 73 and a handle portion 74, the handle portion 74 being raised to permit fluid to flow through vents 75 into the cage 76 where product 60 is dissolved.

10 In a further variation, the two sections of spoon may be arranged to be rotated relative to each other to align vents 75, permitting the liquid to dissolve the product, as illustrated in Figures 35a and 35b.

As an alternative to having the product to be dispensed towards the bowl portion of the spoon, as previously described, the product, as illustrated in Figures 36a and 36b may be contained in a cage 77 having nylon mesh inserts 78, the cage being located at the top of the handle of the spoon. The cage 77 may be a snap fit to the top of the shaft of the spoon 78 thereby permitting easy filling of the cage 77 with an appropriate product. The cage preferably has a protective sleeve 79 around it, which sleeve may indicate the product therein and which is slipped off prior to use.

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A further embodiment is illustrated in Figures 37a and 37b where a spoon, indicated generally as 80, comprises a handle portion 80a and a bowl portion 80b. The handle portion 80a comprises a cage 81 containing a product 60 retained in place by a clip-in disc 82. When the handle portion 80a is fully inserted in the bowl portion 80b, as shown in Figure 37a, the cage 81 is sealed by the bowl portion 80b of the spoon. To dissolve the contents of the cage, the cage is removed from the bowl portion 80b of the spoon and the product dissolved in liquid before the cage is reinserted in the handle portion 80b.

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As illustrated in Figure 37c and 38c, a product may come in any number of flavours

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or types and these may be indicated by the protective seals on the cages of the spoons.

5 Various embodiments of the present invention have been illustrated by way of example, but many more variations will be apparent which fall within the scope of the appended claims. In particular, the invention has been described primarily with reference to beverage applications but the claimed invention is not limited to any particular application.

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### CLAIMS

1. A disposable product dispenser for dispensing product into a liquid prior to consumption, the dispenser comprising a quantity of product sufficient for a drink or dose  
5 and a holder for the product, characterised in that the holder is arranged to permit a user to release the product in a controlled manner and to mix the product with the liquid.
2. A dispenser as claimed in Claim 1, comprising means to maintain the product in a sterile environment until the product is to be dispensed.
- 10 3. A dispenser as claimed in Claim 1 or 2, wherein the holder is arranged to permit the user to dispense the product into the liquid whilst controlling movement of the product in the liquid and permitting the dispensing to be terminated if desired.
- 15 4. A dispenser as claimed in Claim 1, 2 or 3, wherein the product is in the form of a solid block mounted on or towards one end of the holder.
5. A dispenser as claimed in Claim 4, wherein the holder is in the form of a spoon with the product located on the lower region of the spoon handle towards the bowl of the spoon.
- 20 6. A dispenser as claimed in Claim 5, wherein the product is contained in a water soluble starch.
7. A dispenser as claimed in Claim 1, 2 or 3, wherein the holder comprises a mesh or  
25 apertured section defining a cage from which the product is dispensed.
8. A dispenser as claimed in Claim 7, wherein the dispenser is a spoon with the cage mounted on the handle of the spoon towards the bowl of the spoon.
- 30 9. A dispenser as claimed in Claim 8, wherein the spoon is formed of a first portion



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and a second portion with the cage integrally formed with one portion.

10. A dispenser as claimed in Claim 9, wherein the first and second portions of the spoon are arranged to be moved relative to each other to release the product.

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11. A dispenser as claimed in Claim 10, wherein movement of the first portion relative to the second portion opens vents to permit liquid to flow through the cage.

12. A dispenser as claimed in Claim 10, comprising a sealed compartment in which the product is retained prior to use, the spoon being arranged such that movement of the first portion relative to the second portion causes the product to break through the seal into a region through which liquid may flow.

10

13. A dispenser as claimed in any of Claims 7 to 12, wherein the first portion includes a handle portion of the spoon and the second portion includes a bowl portion of the spoon.

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14. A dispenser as claimed in Claim 7, wherein the cage is on the end of the handle of the spoon.

15. A dispenser as claimed in any one of Claims 7 to 14, wherein the product is a granular soluble solid.

20

16. A dispenser as claimed in any one of Claims 7 to 14, in which the product is a liquid.

25

17. A dispenser as claimed in Claim 16, wherein the liquid is oil based.

18. A dispenser as claimed in Claim 1 or 2, wherein the holder comprises a straw having product located therein, the straw and product being arranged such that a user sucking liquid through the straw causes the liquid to pass over and dissolve the product.

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19. A dispenser as claimed in Claim 18, wherein the product is solid and formed integrally with the holder.

20. A dispenser as claimed in Claim 18, wherein the holder comprises a chamber  
5 located on the straw between a lower and an upper section of the straw, which chamber is arranged to receive product in the form of a capsule.

21. A dispenser as claimed in Claim 20, wherein the capsule is inserted into the chamber through the lower or upper section of the straw.

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22. A dispenser as claimed in Claim 20 or 21, wherein the chamber comprises flexible walls which can be compressed by a user wherein the capsule is frangible such that the product is retained in a sealed environment until the capsule is ruptured by squeezing the chamber when the capsule is located in the chamber.

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23. A dispenser as claimed in Claim 22, wherein the capsule is designed to rupture in a predetermined manner such that the product is released at a predetermined rate, relative to the flow of liquid through the chamber.

20 24. A dispenser as claimed in Claim 1 or 2, wherein the dispenser comprises a straw having an inlet and outlet at opposite ends and one or more intermediate apertures between the ends of the straw, the intermediate apertures being surrounded by a compressible reservoir containing product to be dispensed as liquid is sucked through the straw.

25 25. A dispenser as claimed in Claim 24, wherein the reservoir is compressible and arranged such that pressure exerted on the outside of the reservoir will control the rate at which the product is dispensed.

26. A dispenser as claimed in Claim 24 or 25, wherein the intermediate apertures  
30 comprise seals arranged to dissolve as liquid is sucked through the straw.

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27. A dispenser as claimed in Claim 24 or 25, wherein the intermediate apertures comprise seals arranged to rupture when sufficient pressure is exerted on the reservoir.

28. A dispenser as claimed in Claim 1 or 2, wherein the holder comprises a dispensing valve in which product is retained, the valve being arranged to receive and seal to a liquid reservoir such that the product is mixed with the liquid as liquid passes from the reservoir through the valve.

29. A dispenser as claimed in Claim 28, wherein the holder further comprises a dispensing nozzle arranged to be immersed in a drink, the dispensing nozzle receiving liquid and product from the valve and being arranged to direct this as jets into the drink.

30. A dispenser as claimed in Claim 28 or 29, wherein the valve is arranged to receive a capsule containing product to be dispensed.

31. A dispenser as claimed in Claim 1 or 2, wherein the holder comprises a compressible bulb containing a product, the bulb having a plurality of outlets through which the product is directed as jets when the bulb is compressed, the jets being covered by a seal which is arranged to be removed prior to use.

32. A dispenser as claimed in Claim 31, wherein a plurality of bulbs are integrally formed as a strip, the bulbs being arranged to be removed individually from the strip.

33. A dispenser as claimed in Claim 31 or 32, wherein the product is an alcoholic liquid.

34. A dispenser as claimed in Claim 1 or 2, further comprising a mixing section having an inlet and an outlet, means defining a first path, extending helically in one sense about an axis, means defining a second path extending helically in the opposite sense about said axis, both said paths being positioned to receive substantially equal amounts of fluid from said

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inlet and to discharge the fluids flowing there along to a common location adjacent said outlet, whereby to effect turbulent mixing.

35. A dispenser as according to Claim 34, wherein said inlet lies vertically above the outlet, and wherein each of said paths slopes to the vertical at an angle in the range of from 30° to 60°.

36. A dispenser according to Claim 34, wherein said inlet lies above said outlet and wherein each of said paths slopes with respect to the horizontal at an angle in the range of from 40° to 50°.

37. A dispenser according to any one of Claims 34 to 36, wherein said mixing section comprises a cylindrical body having a central axially extending member, and wherein said means defining the first and second paths comprises first and second arcuate flanges supporting said central member from the wall of said body.

38. A dispenser according to Claim 37, wherein each of said arcuate flanges subtends at an angle of 180° about said axis and lies on the diametrically opposite side of said axis to the other flange.

39. A dispenser according to Claim 37 or 38, wherein the downstream end of each of said arcuate flanges defines an abrupt termination of the path.

40. A dispenser according to any one of Claims 34 to 39, including a dispensing section having an inlet coupled to the outlet of the mixing section and having an elongate conical section which reduces in diameter with distance from the inlet, the conical section having two substantially planar faces on diametrically opposite sides thereof, and apertures in each face to discharge fluid entering the conical section from its inlet.

41. A dispenser according to Claim 40, wherein the apertures in each said face are

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arranged substantially equally spaced from one another in a row extending centrally and longitudinally of said faces.

42. A dispenser according to any one of Claims 34 to 41, including a storage section  
5 having an outlet which can be coupled to the inlet of the mixing section, and an elongate hollow bulbous portion extending from its inlet and for storing fluid.

43. A dispenser according to Claim 37, including a sealing membrane extending across  
10 the inlet of the storage section to seal the fluid in the bulbous section.

44. A dispenser according to Claim 43, wherein said mixing section includes piercing  
means for piercing said membrane to release said fluid from the storage section when the  
outlet of said storage section becomes fully engaged with the inlet of said mixing section.

15 45. A dispenser according to Claim 43, as dependent on Claims 4, 9, 10 and 11, wherein  
said piercing means is carried by the leading end of said central axially extending member.

46. A dispenser according to any one of Claims 42 to 45, wherein said bulbous portion  
is flaccid or flexible and can be squeezed.

20 47. A dispenser according to Claim 44, including locking means for releasably locking  
said storage section and said mixer section in partial engagement to prevent the rupture of  
said membrane by said piercing means, release of said locking means enabling full  
engagement to take place with the consequent rupture of said membrane.

25 48. A dispenser as claimed in any preceding claim, wherein the quantity of product is  
sufficient for only one drink or dose.

49. A dispenser substantially as hereinbefore described, with reference to and/or as  
30 illustrated in one or more of the accompanying drawings.

FIG. 1

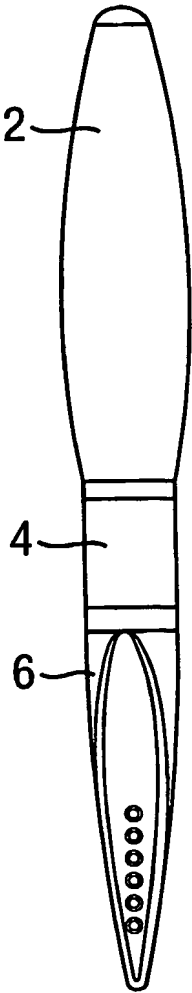


FIG. 2

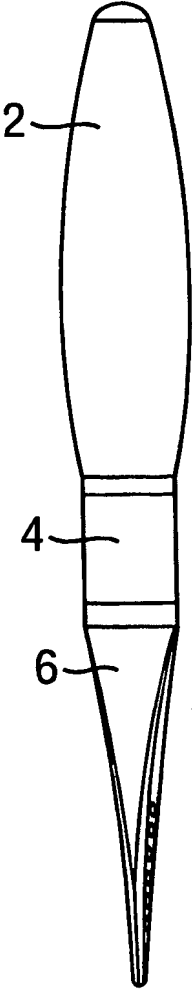


FIG. 3

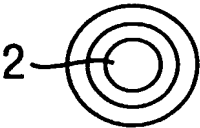


FIG. 4

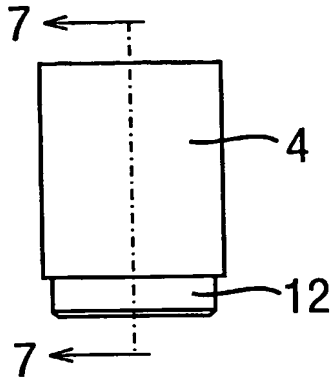


FIG. 5

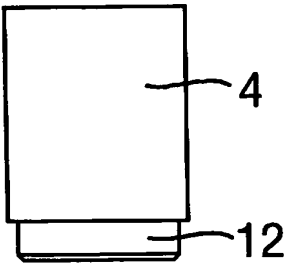


FIG. 6

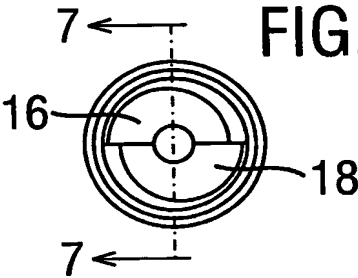


FIG. 7

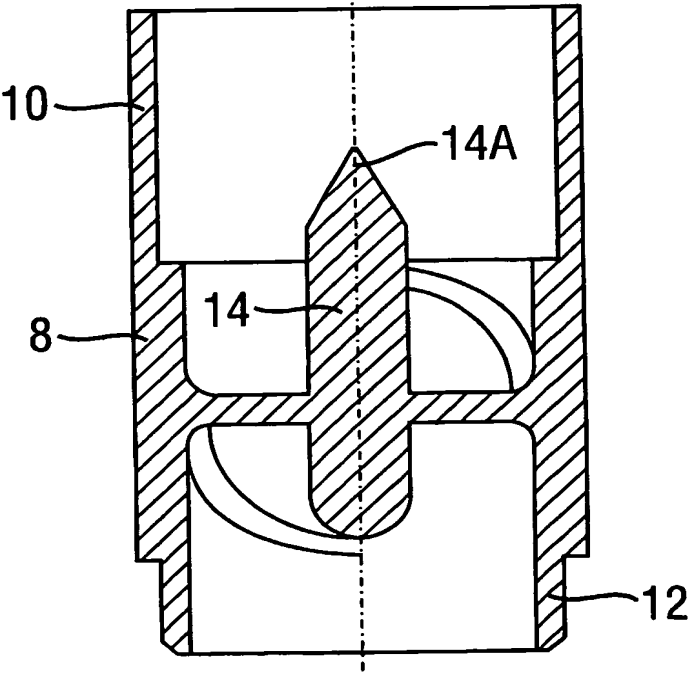


FIG. 8

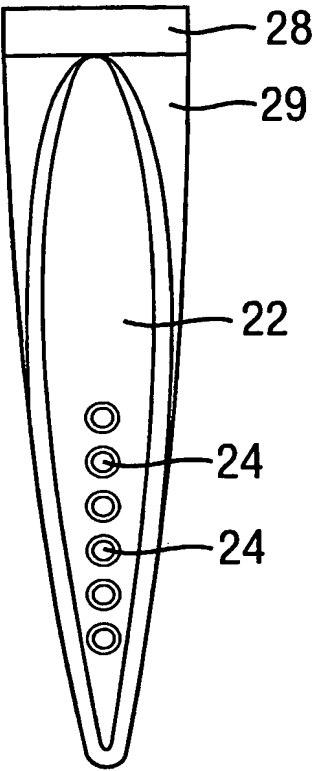


FIG. 9

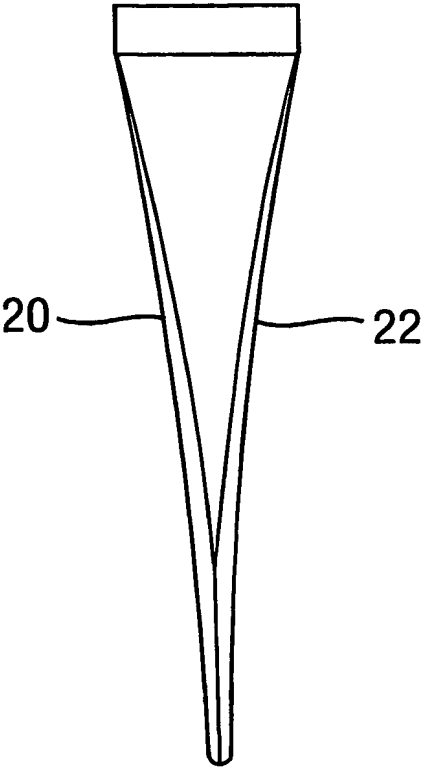
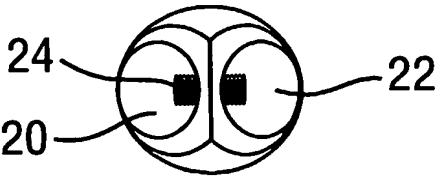


FIG. 10





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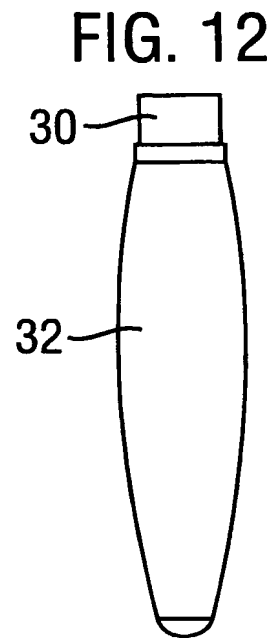
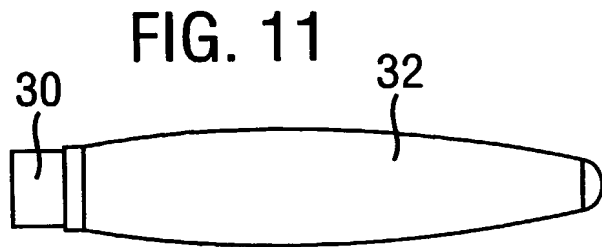


FIG. 13

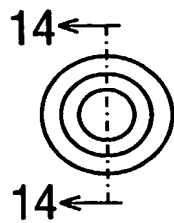
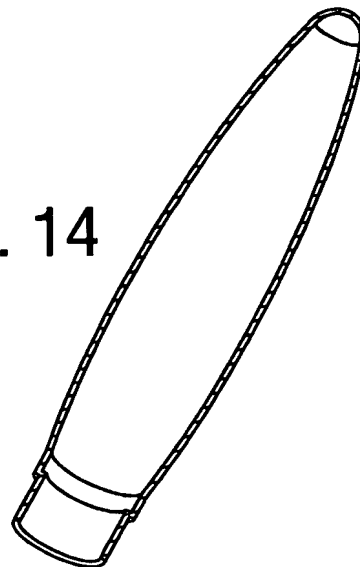
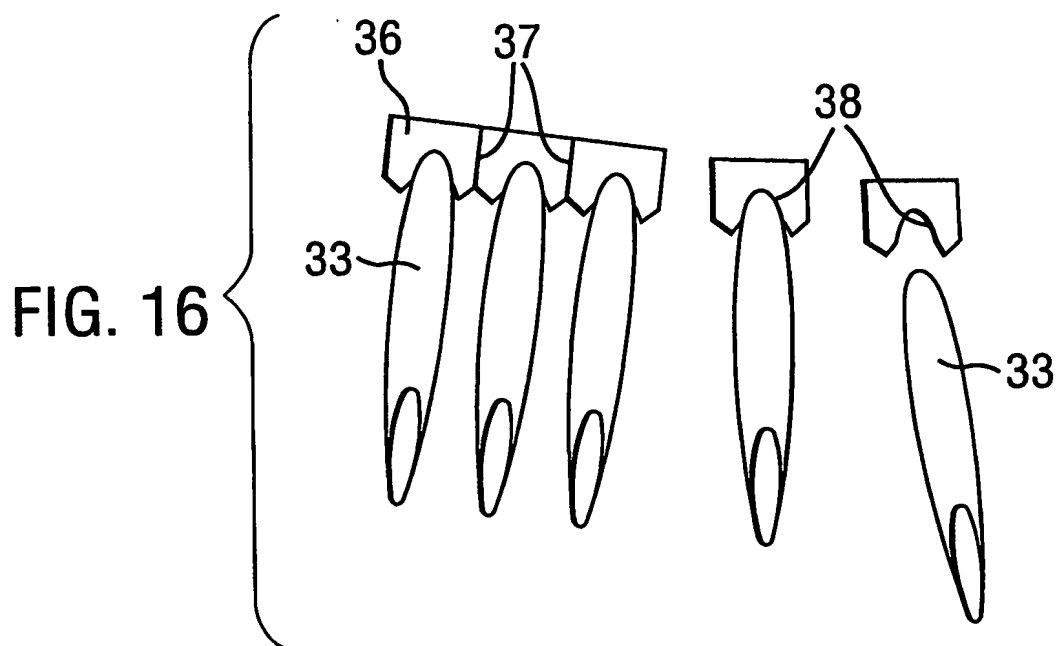
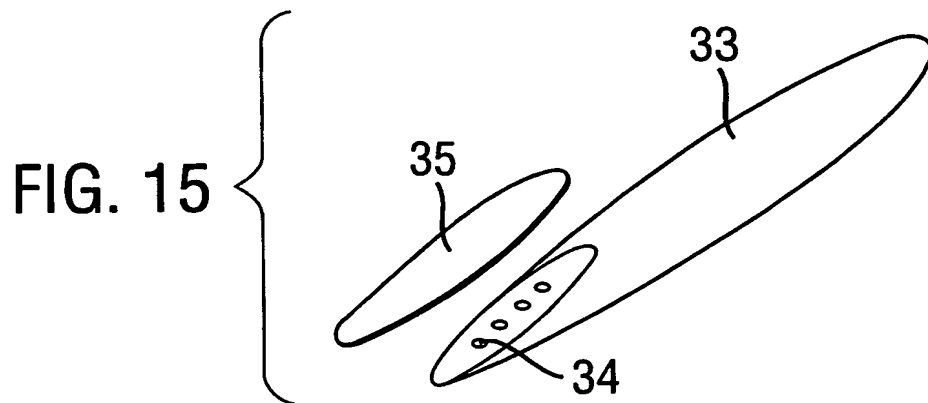


FIG. 14



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FIG. 17

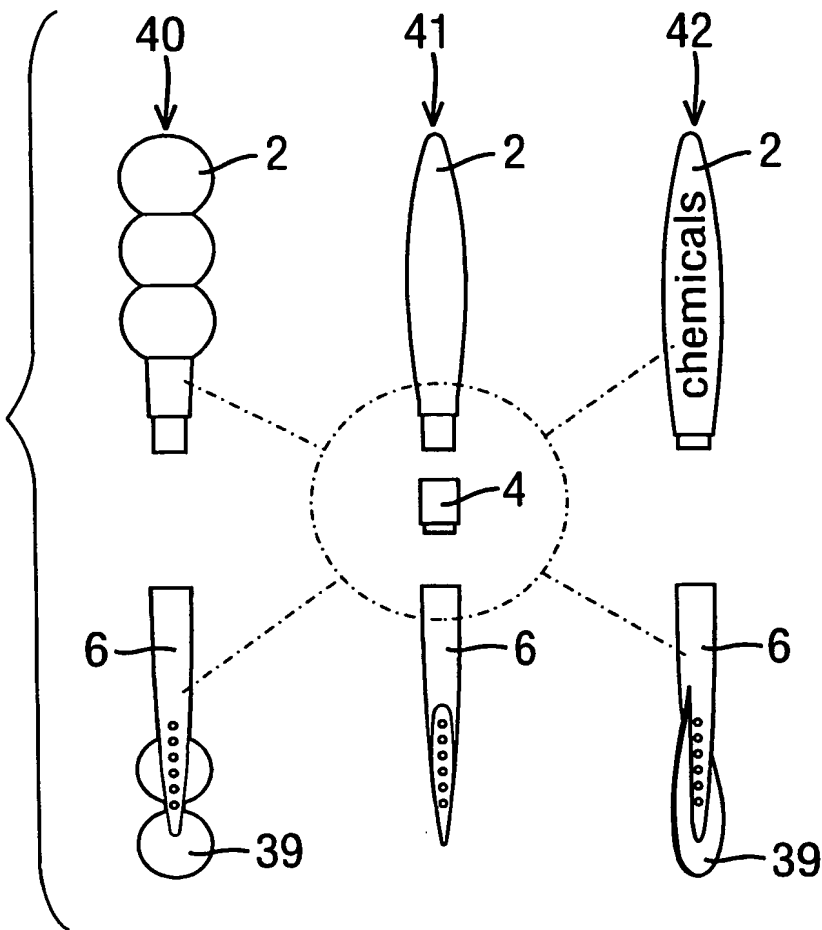
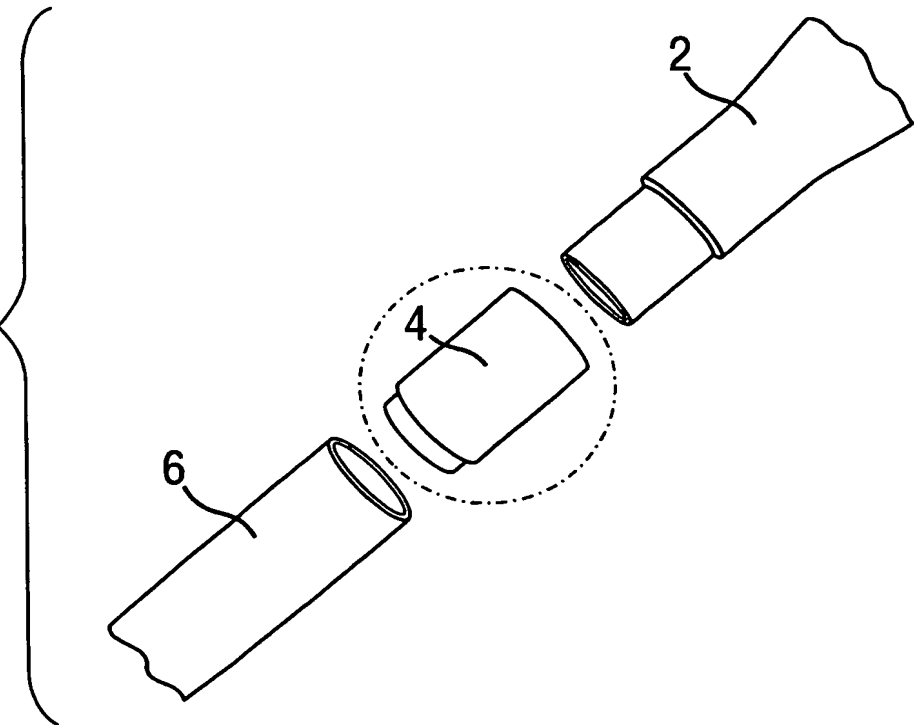


FIG. 18



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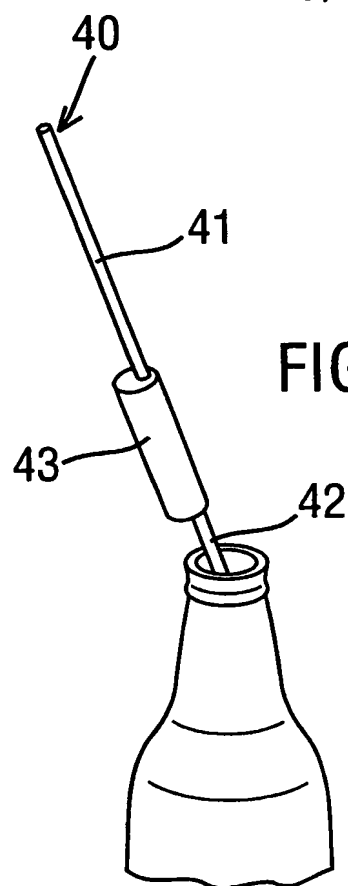


FIG. 19

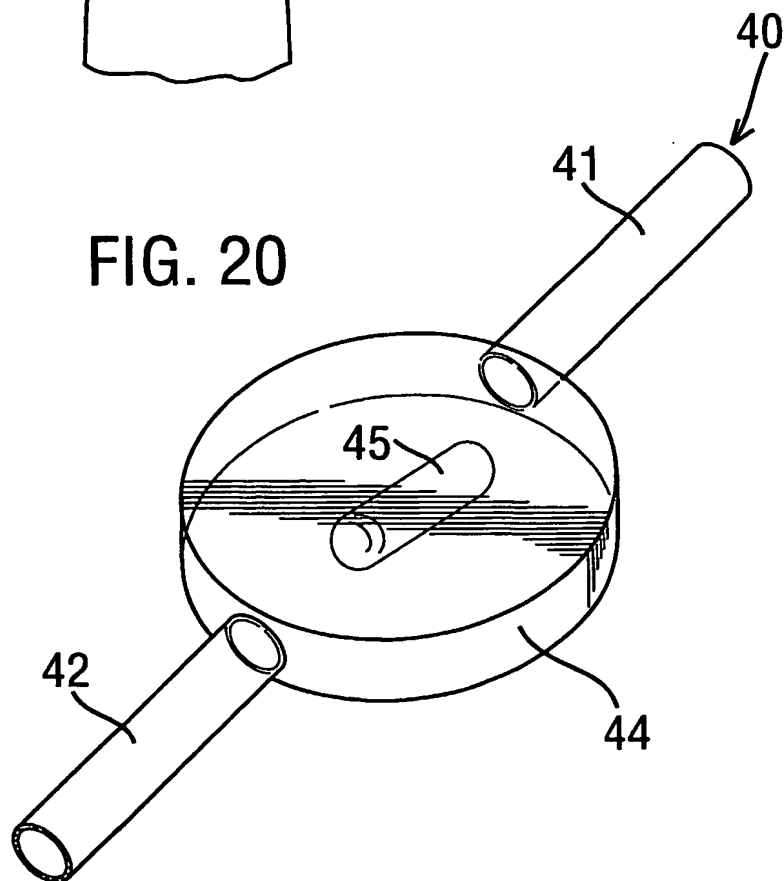
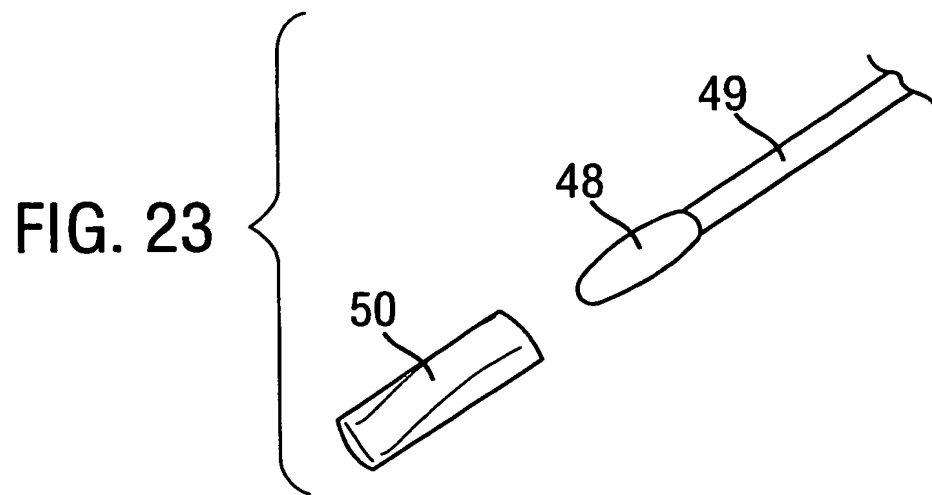
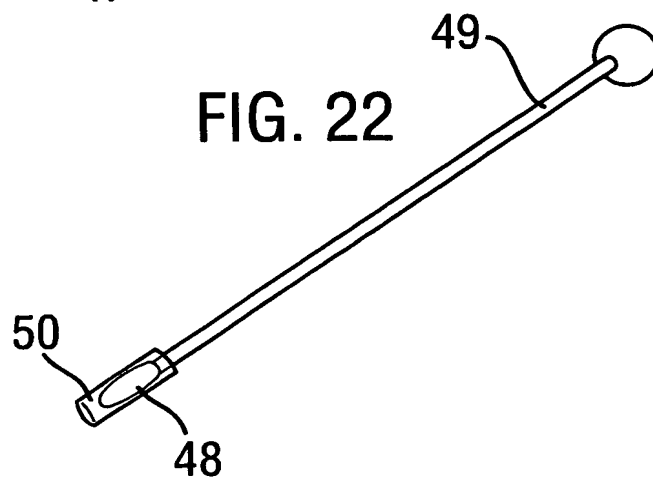
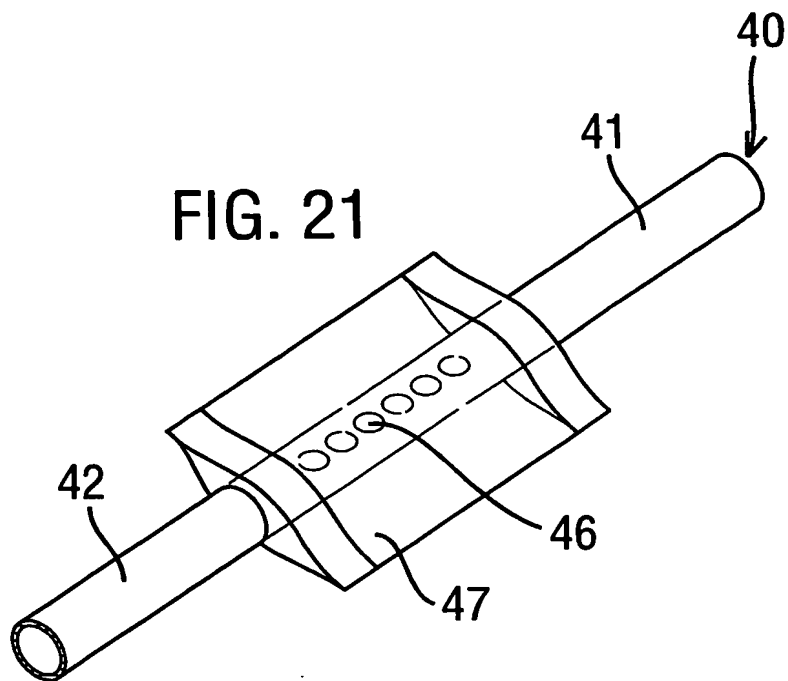


FIG. 20

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FIG. 24a

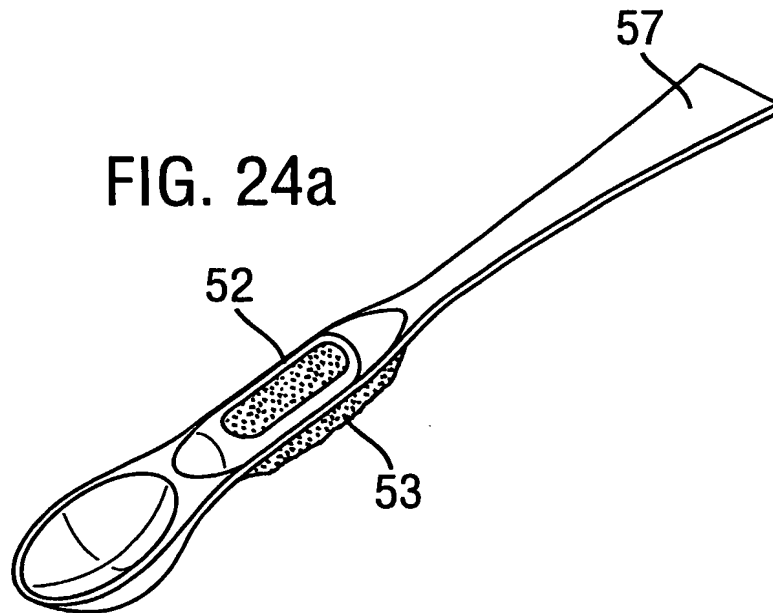
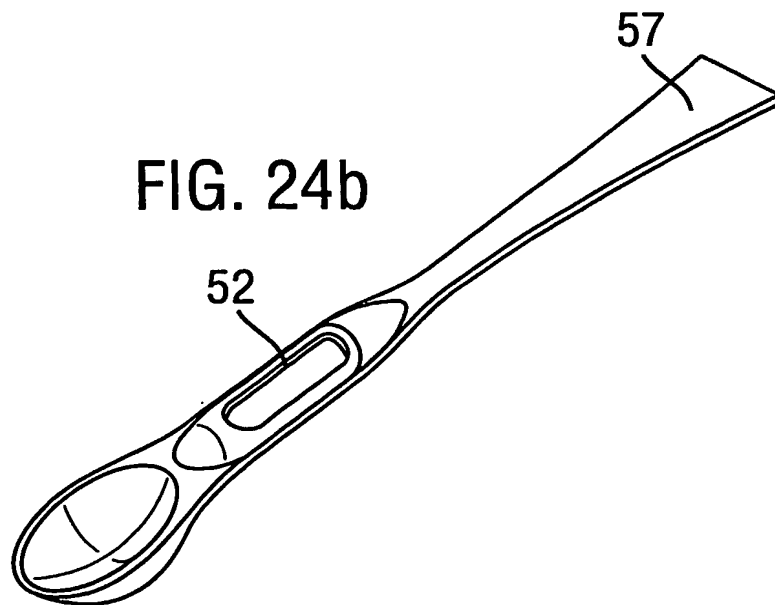


FIG. 24b



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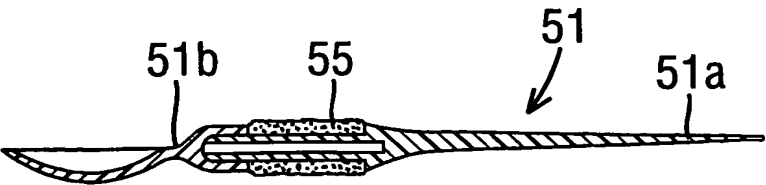


FIG. 25a

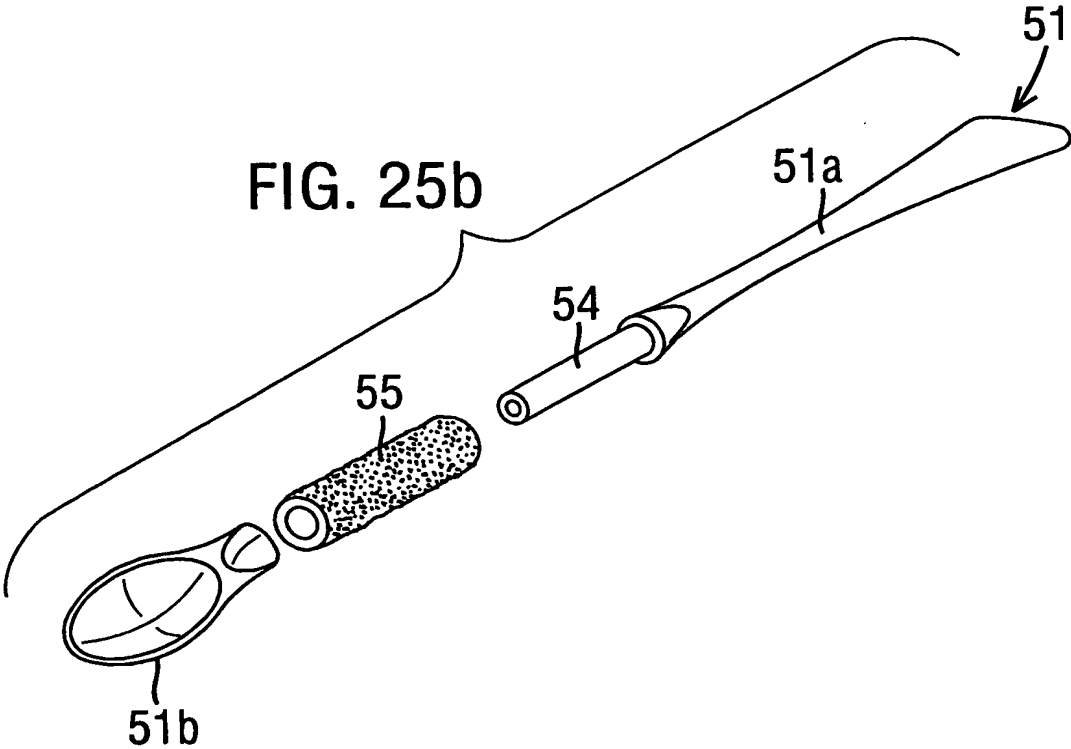


FIG. 25b

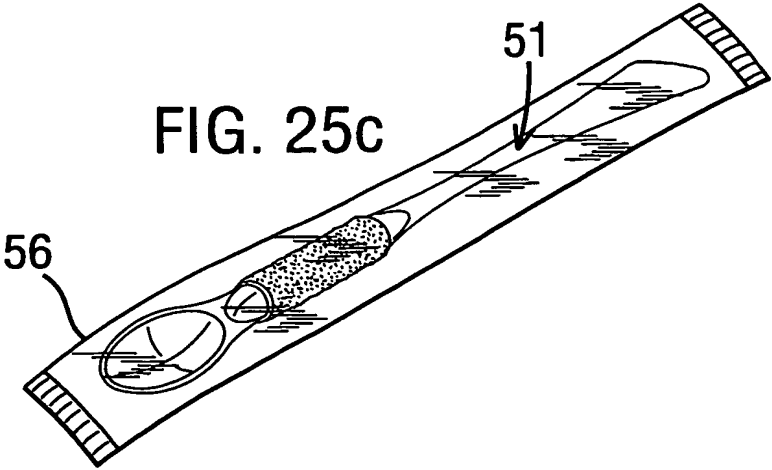


FIG. 25c

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FIG. 26a

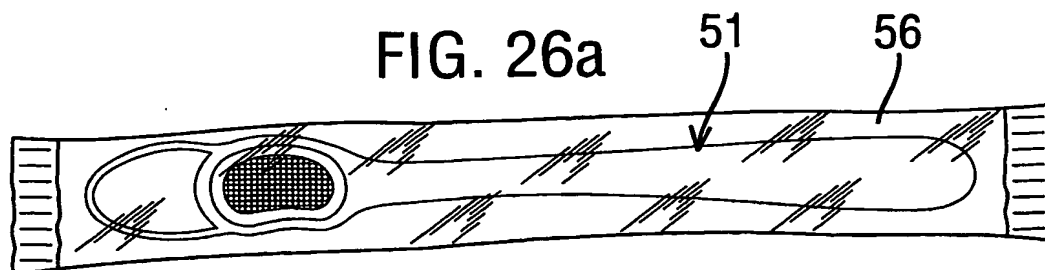
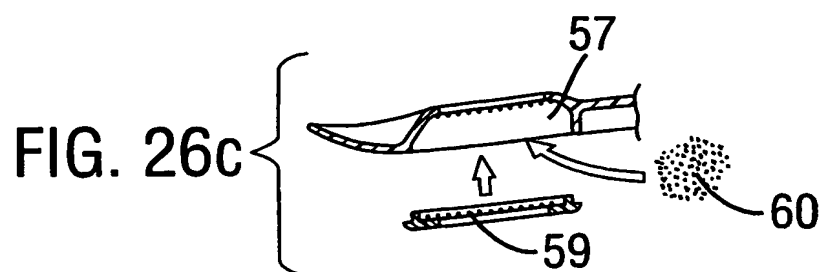
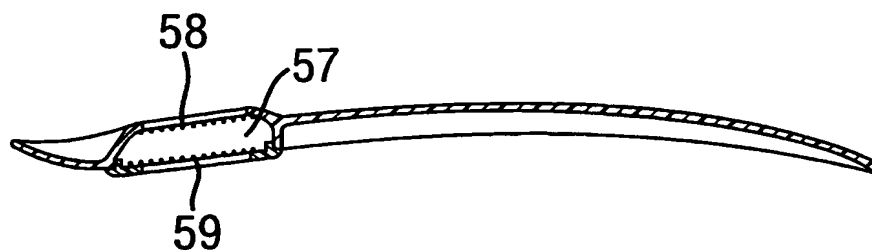


FIG. 26b





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FIG. 27a

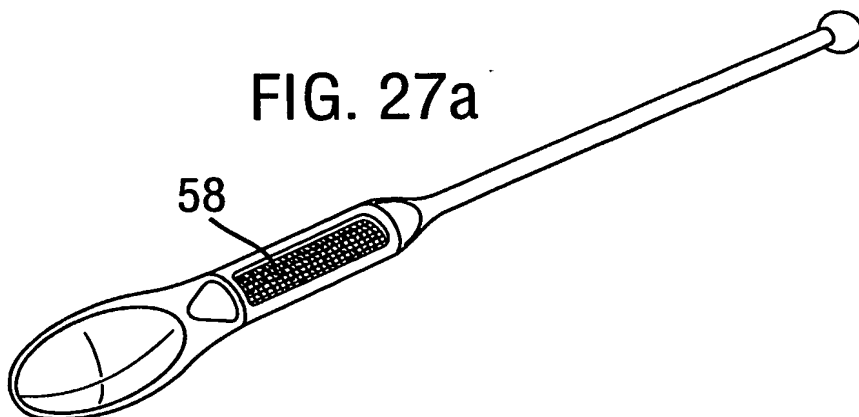


FIG. 27b

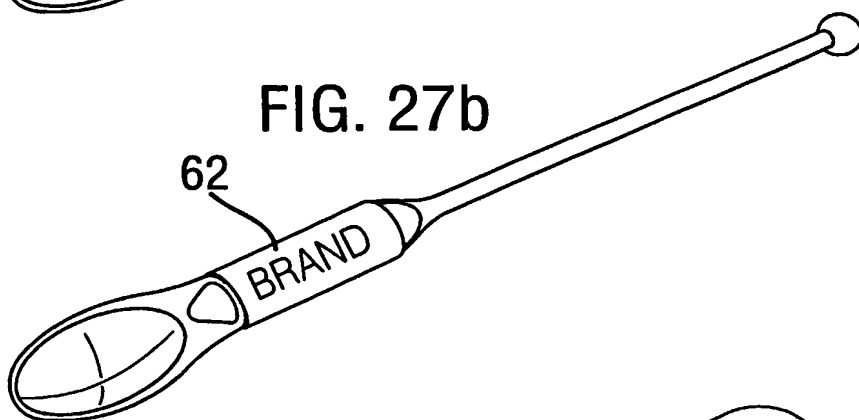


FIG. 28a

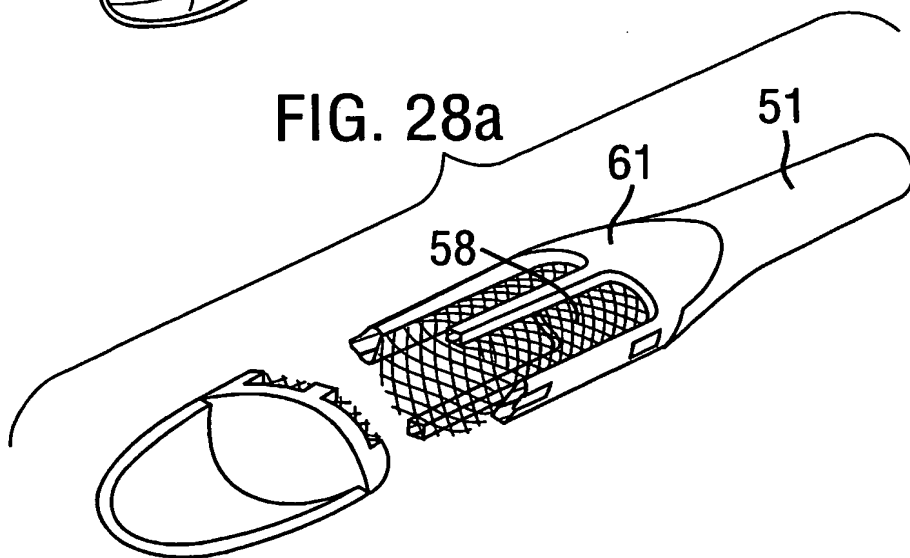
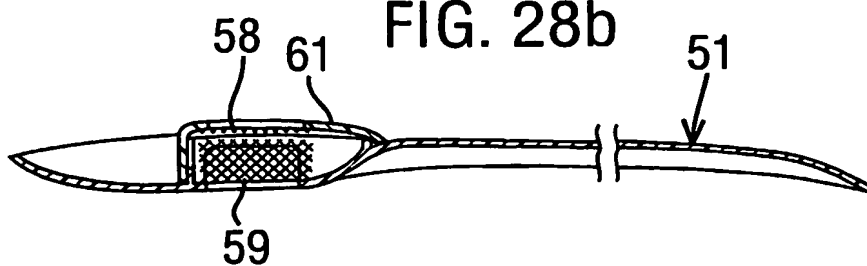


FIG. 28b



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FIG. 29a

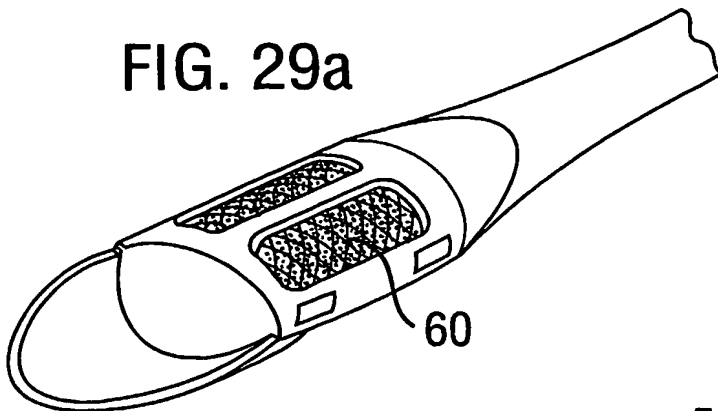


FIG. 29b

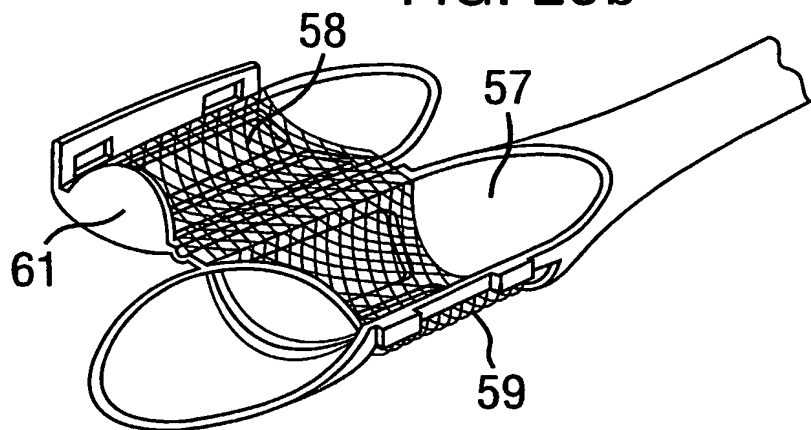


FIG. 30a

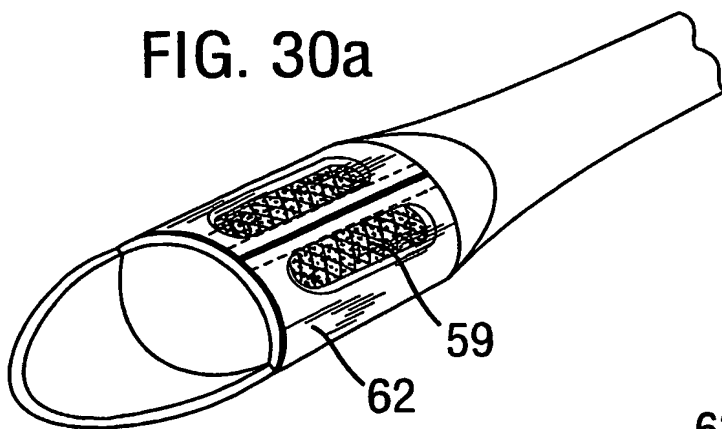
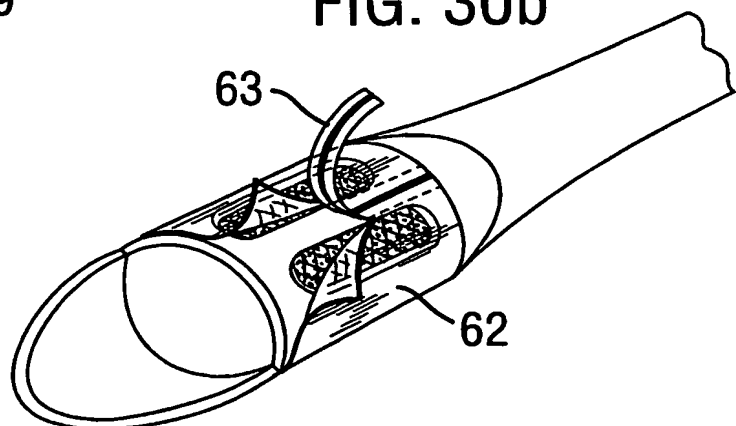
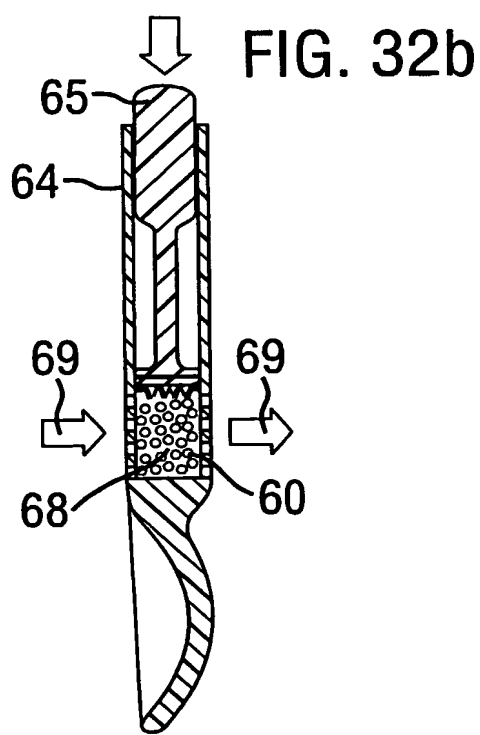
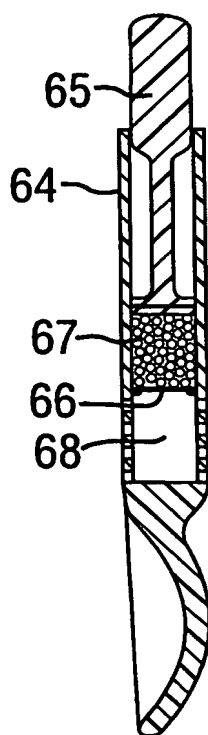
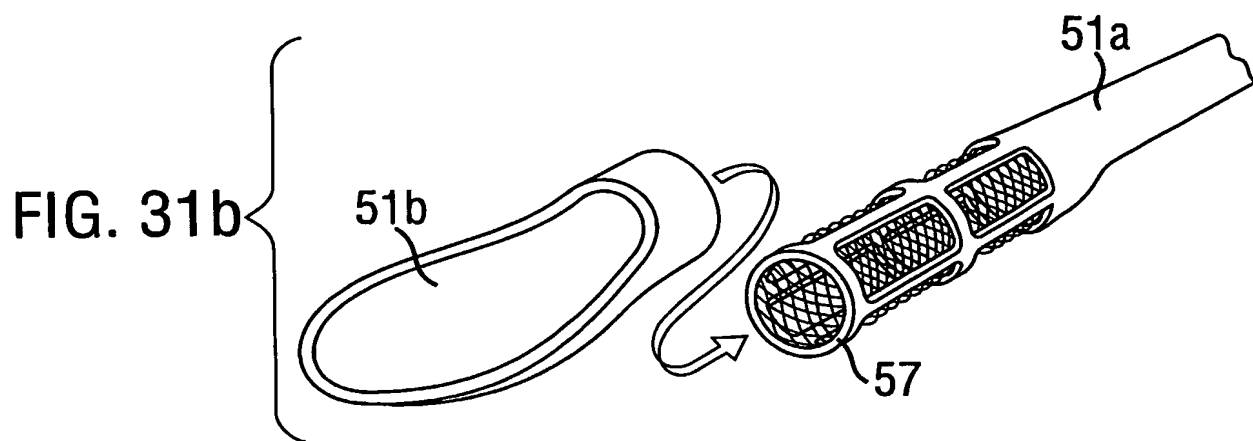
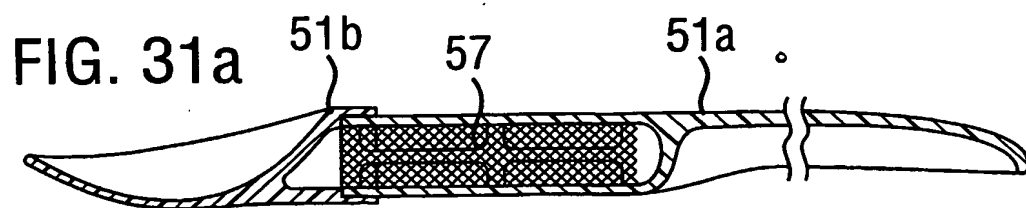


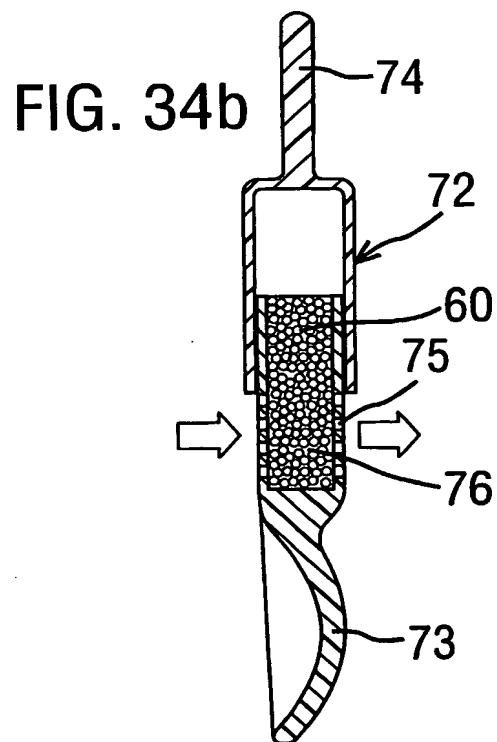
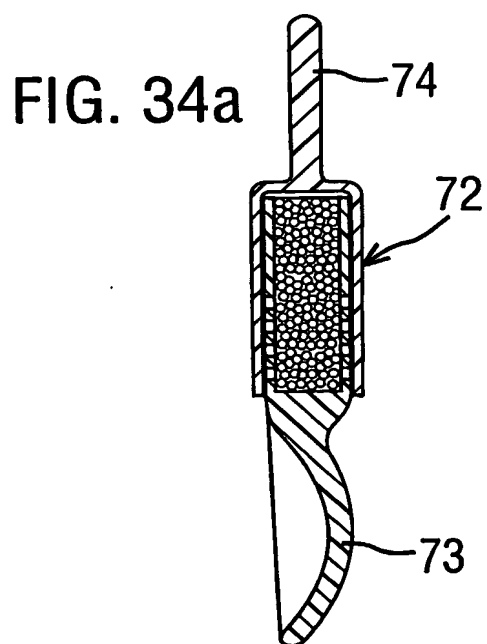
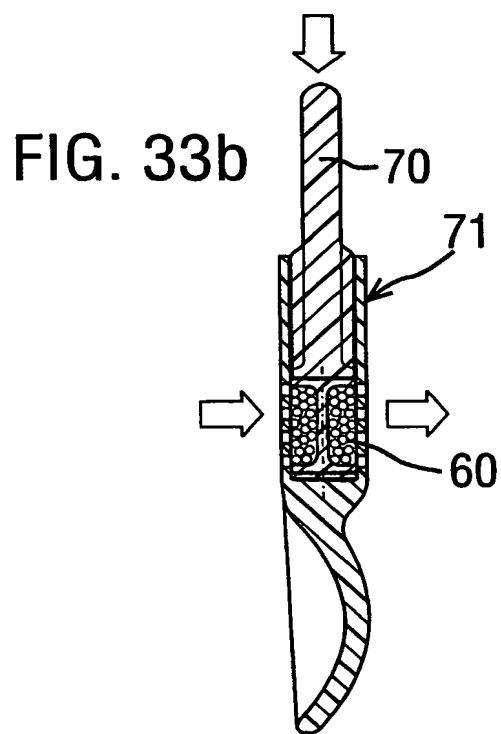
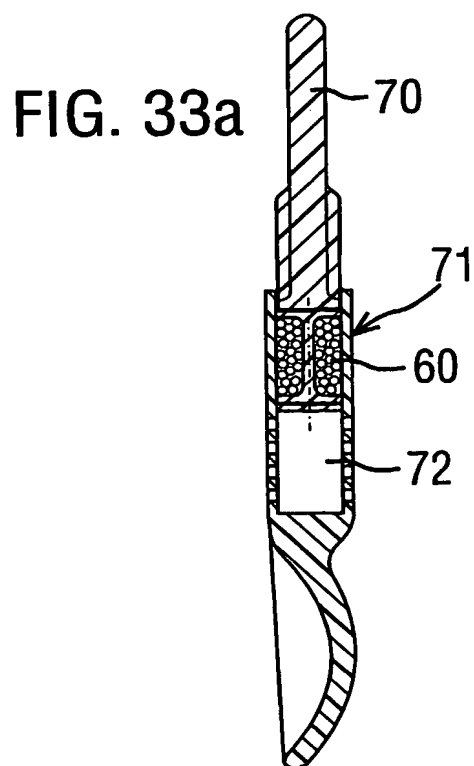
FIG. 30b



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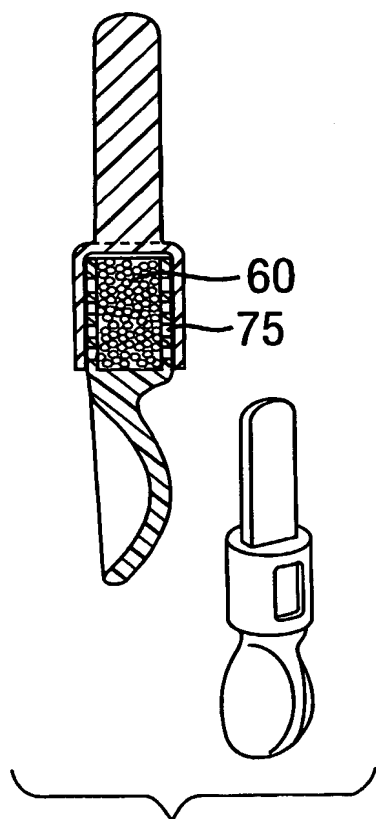


FIG. 35a

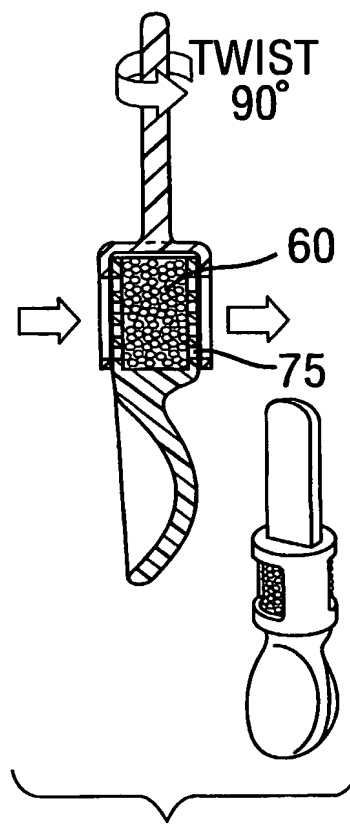


FIG. 35b

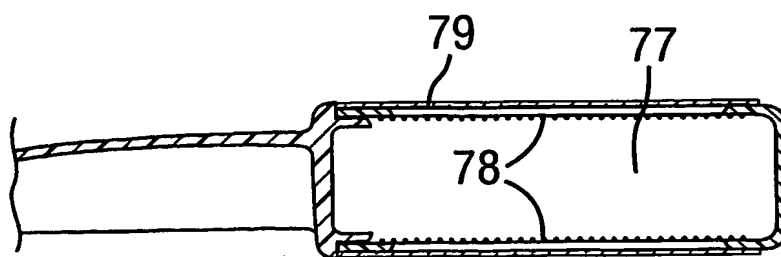


FIG. 36a

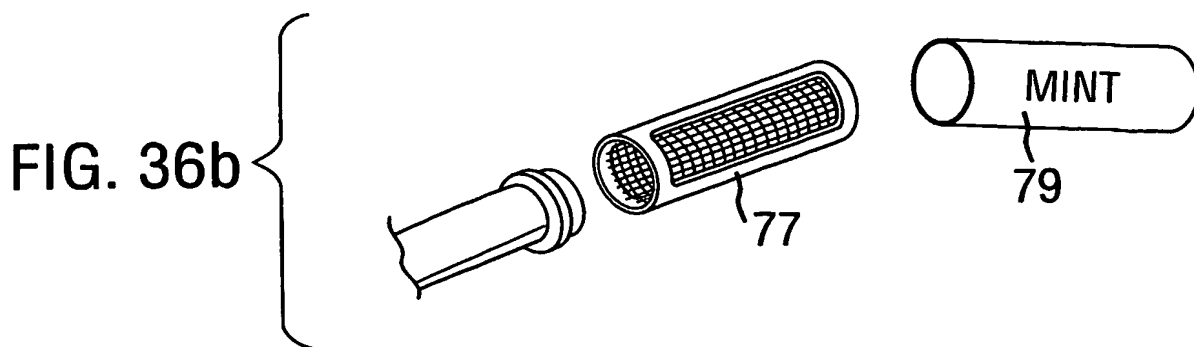
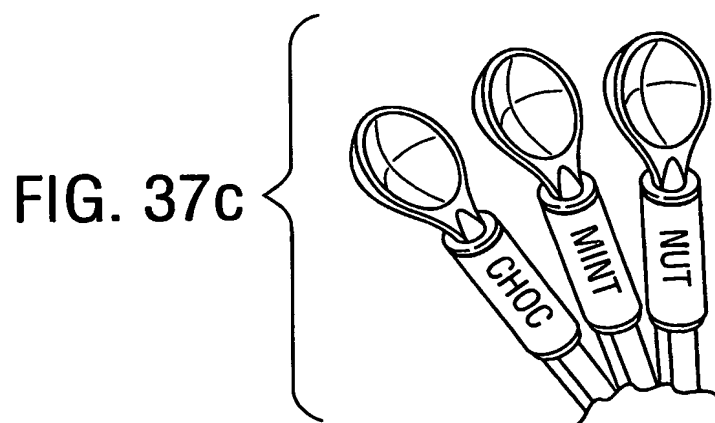
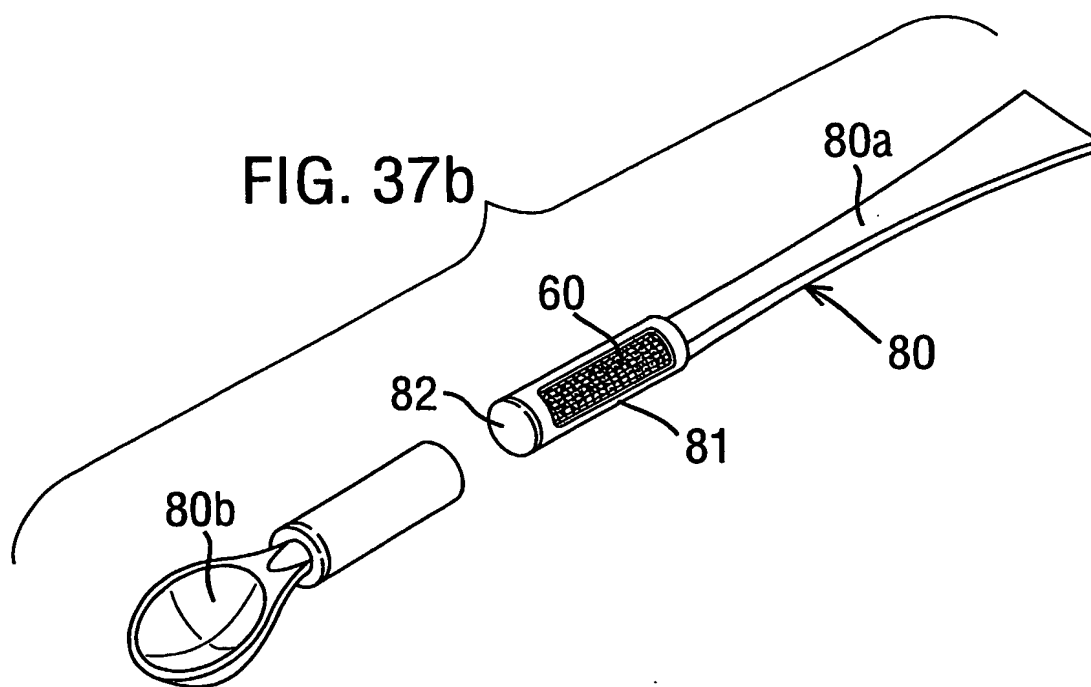
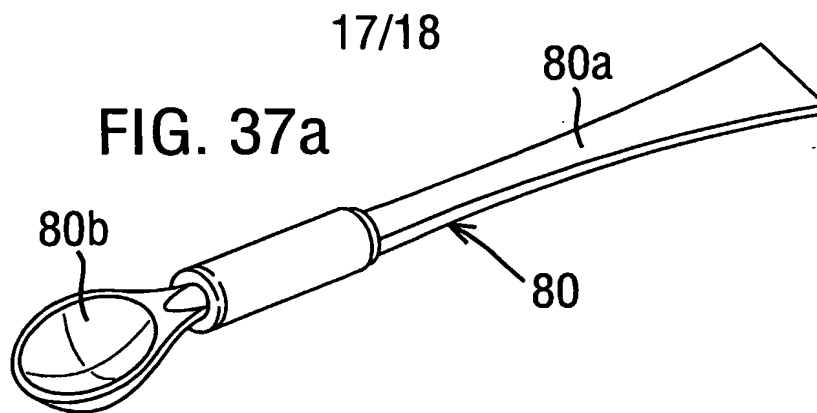


FIG. 36b



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FIG. 38a

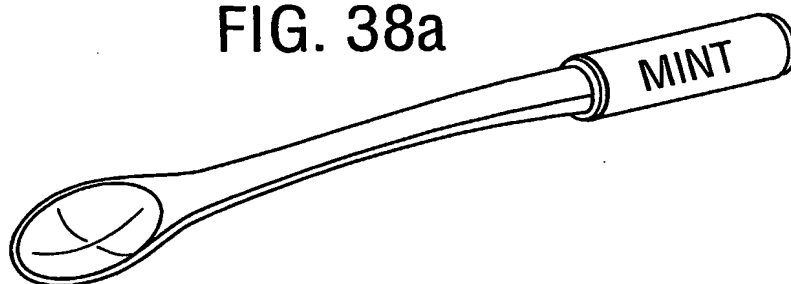


FIG. 38b

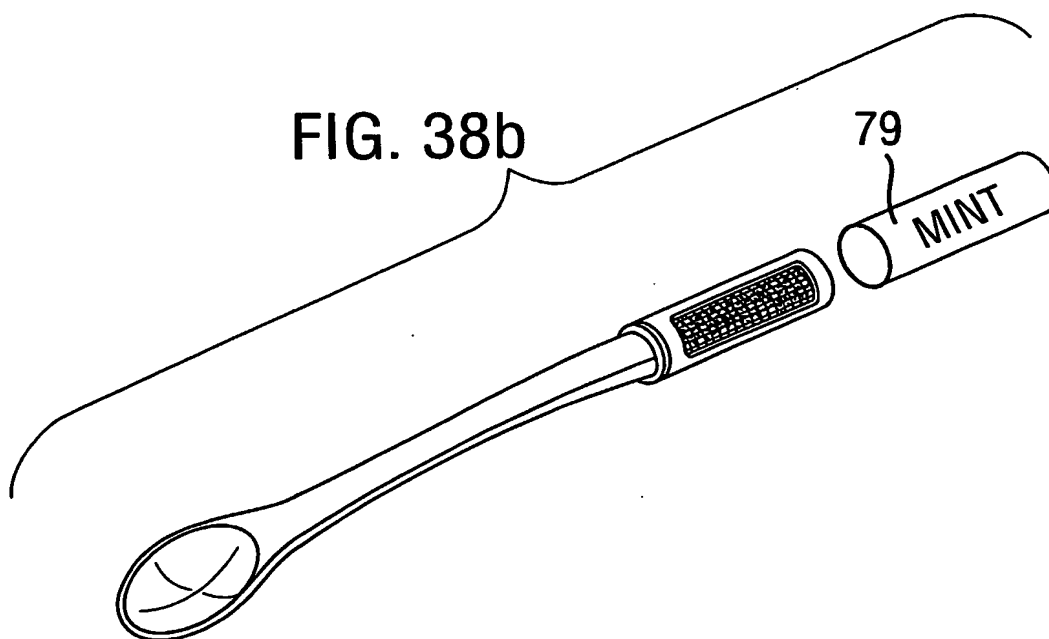
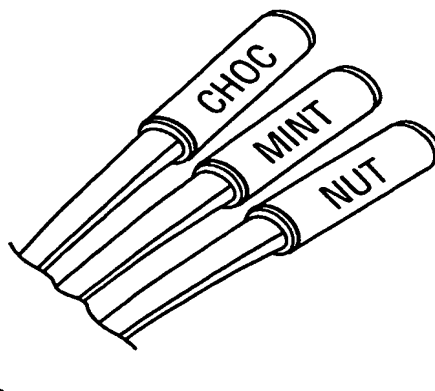


FIG. 38c



# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 03/01700

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65D81/32 B65D25/08 A47G21/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65D A47G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 767 026 A (KELLER WILHELM A ET AL) 30 August 1988 (1988-08-30) the whole document ---	
A	US 6 302 574 B1 (CHAN KWAN-HO) 16 October 2001 (2001-10-16) the whole document ---	
A	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 03, 31 March 1999 (1999-03-31) -& JP 10 337321 A (TERUMO CORP), 22 December 1998 (1998-12-22) abstract ---	
A	US 3 739 947 A (BAUMANN E ET AL) 19 June 1973 (1973-06-19) figures ---	
-/--		

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

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- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

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- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

25 July 2003

Date of mailing of the international search report

01/08/2003

Name and mailing address of the ISA

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NL - 2280 HV Rijswijk  
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Fax: (+31-70) 340-3016

Authorized officer

Fournier, J



# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/01700

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DE 20 60 626 A (DENTAIRE IVOCLAR ETS)  22 June 1972 (1972-06-22)  figures</p> <p>-----</p>	

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 03/01700

### Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☒ Claims Nos.: 2-33, 49  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

#### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 2-33,49

The initial phase of the search revealed a very large number of documents relevant to the issue of novelty. So many documents were retrieved that it is impossible to determine which parts of the claims may be said to define subject-matter for which protection might legitimately be sought (Article 6 PCT). For these reasons, a meaningful search over the whole breadth of the claims is impossible. Consequently, the search has been restricted to a disposable product dispenser comprising a combination of the technical features of claims 1, 34, 40 and 42 and to such a dispenser having the additional technical features described in claims 43-48.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/01700

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4767026	A	30-08-1988	US RE36235 E	29-06-1999
US 6302574	B1	16-10-2001	US 6409972 B1	25-06-2002
			CA 2168274 A1	07-12-1996
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			CH 537841 A	15-06-1973
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			SE 360974 B	15-10-1973
			US 3739947 A	19-06-1973

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